XR16L784 Evaluation Board User's Manual
Rev 1.2

Introduction

Exar is proud to announce our new ISA 4 Port UART. The XR16L784 is fully feature and 16550 compatible. For a list of features, refer to the data sheet at www.exar.com.

This user's manual will help you to install the Windows NT 4.0 Driver and Application Program. Once installed, it demonstrates it's transmit and receive capability on all four ports in full duplex and two in half duplex. The application program allows you to select operating parameters, FIFO trigger levels, hardware or software flow control, and selection of test data patterns.

Description

On the XR16L784 evaluation board, we have switches for addressing from 400 to B00H and jumpers IRQ3-7 and IRQ10-14. We have added a +3.3v regulator to operate the XR16L784 at +5v or +3.3v. There are four ports that use the four RS-232 ports 921.4kbps and one RS-485 2.5Mbps ports (option1). There is a infrared (IR) circuit that is used for transmitting and receiving data at maximum of 4 Mb/s (option 2).
There is an external clock circuit (U4) or the standard crystal 14.7456Mhz. U4 clock multiplier chip (ST49C101A-XX) is used factory external clock test. U4 can be clocked at multiple of 2,3,4,5,6,8,10 and 12, depending on the part selected (ST49C101A-XX) parts not installed. On the XR16L784 evaluation board, there are several sets of jumpers. Jumpers and Test Points are described under default setting below.

Warning: When installing the XR16L784 board, follow ESD Safety Procedures. Ground yourself to prevent damage to the any electronic component.

Default setting for the XR16L784

Table 1

JUMPER	FUNCTION
J2	+3.3V
J5	ENIR Disable
JP3	IRQ5
J16-1&2	RXD0
J17-1&2	RXD1
SW1-2	500H
SW3-2, 3, 4, &5	Factory Testing

Selectable Jumpers for the hardware on the XR16L784
Table 2

JUMPERS	FUNCTION
J2-1	+VREG Power to UART (circuit not installed)
J2-2	+3.3V Power to UART
J2-3	+5V Power to UART
J3	-RESET
J5	ENIR
J6	+3.3V_MAX (not installed) OPTIONAL 1
J7	RS-485 (not installed) OPTIONAL 1
J8	RXD/TXD OUTPUT RS-485 (not installed) OPTIONAL 1
J9	TXD3/RXD3 SELECT RS-485 (not installed) OPTIONAL 1
J10	TXD3 IR (not installed) OPTIONAL 2
J11	MODE 0 IR (not installed) OPTIONAL 2
J12	RXD3 IR (not installed) OPTIONAL 2
J13	MODE 1 IR (not installed) OPTIONAL 2
J14	FIR_SEL IR (not installed) OPTIONAL 2
J15	RS-232 CONNECTOR 4 CHANNELS
J16-1	RXD0
J16-2	RX0
J16-3	TXD1
J17-1	RXD1
J17-2	RX1
J17-3	TXD0
J18	JTAG FOR CPLD PROGRAMMING FACTORY USE
J19	FACTORY USE
JP1	IRQ3
JP2	IRQ4
JP3	IRQ5
JP4	IRQ7
JP5	IRQ9
JP6	IRQ10
JP7	IRQ11
JP8	IRQ12
JP9	IRQ14
JP10	IRQ15
JP14	FACTORY USE
JP15	FACTORY USE
JP12-1	TXD0_RS232
JP12-2	RXD0_RS232
JP13-1	TXD1_RS232
JP13-2	RXD1_RS232
J16-1	RXD0
J16-2	RX0
J16-3	TXD1
J17-1	RXD1
J17-2	RX1
J17-3	TXD0
JP29-2	RXD1_RS232

SW1 1-8	ADDRESS SELECT 400-B00
SW3 1	16 MODE/-68 MODE
SW3 2-4	FACTORY USE
SW4	FACTORY USE

Table 1. Port number label association to internal UART channels.
Table 3

XR16L784	Octopus Cable (port number label)
Channel 0	Port 1
Channel 1	Port 2
Channel 2	Port 3
Channel 3	Port 4

Installation of NT4.0 Driver, Application and GUI Program

IT IS RECOMMENDED TO HAVE A SYSTEM THAT IS AT LEST 350MHZ

Turn your computer on, and set your display setting to 1024 by 768 resolution.
Install the XR16L78x NT Driver, application and GUI.

- Insert XR16L784 Disk in Drive D
- Run D:\setup.exe.
- Follow the setup Instructions
- Press Next >
- Press Next >
- Choose (IRQ 5)-Default
- Select Com Number (Port 5)-Default
- Select Com Base I/O address (5=500)-Default
- Press Next >
- Press Finish
  Note: IRQ, COM ports and base address are jumper and soft selectable. If it is changed, make sure that the correct jumpers and soft options are selected.
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- Remove disk from Drive D. **Re-boot your computer.**
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The device driver and GUI are now installed and are ready to be used. Before you can transmit any data, set up the GUI application program.
Select Start/Program/Exar78x/Serial78xUI
Below is the description of the Menus and different set-ups.
SerialUI-ExarXR17C15x/XR16L78x UART Series Test Program: On the top of the menu, there is a pull down menu. Selections are as following:

TEST:
Start- Start the transmission of data
Stop- End the transmission of data
Delay- Used to delay transmitted data to the next transmitted data **(10msecs)**
Exit- Exit the application
Config:
Load- Loading a File from the hard or floppy drive
Save-Save desired files for future use
Help- Help files

Setup:
Port Settings-used to enable or disable ports settings

View:
Toolbar-Enable or disable toolbar
Status Bar- Enable or disable status bar
Help:
About Serial78xUI-product description and revision level

Tool bar description: There are six icons that can be used in the SerialUI operation. From left to right as follows.

- Port Setting: See below
- Test Start: Start test
- Test Stop: Stop test
- Load Configuration: Load configuration
- Save Configuration: Save configuration
- Help: See below

Get Started and Set Up Port Setting
Now you can set one or eight ports as needed by selecting **Setup and Port Settings.** You will see the **Ports Properties Menu**; Select the desired Port by Checking Open Port for Testing.

- For each Channel, Select the **Baud Rate** at which you want to transmit and receive.
- Select each channel's **Baud Rate** (110 to 921,600 are available).
- Select the **Data Length (8)**
- **Parity (None)**
- **Stop Bits (1)**
- **Flow Control** Hardware-RTS/CTS, Software Xon/Xoff and None No Flow Control **(None)**
- **Com Base (Com5)** Refer to Table 4
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Table 4

Standard PC assigned Com Port
Com1
Com2
Com3
Com4
XR16L78x Com Port
Com5
Com6
Com7
Com8

- **DTR Hysteresis (6)**
- **RTS Hysteresis (8)**
- **TX FIFO Trigger Level (32)**
- **Rx FIFO Trigger Level (32)**
- **Note**: Set the Trigger Levels as follows- 16 ≤ Tx (Rx) Trig Level ≤48.

- **Port Enable** Top left corner on each Port's Menu. This will **enable** or **disable** the windows for transmit and receive data. Make sure that the transmit side and receive side are the same settings.
- Once you have enabled the Port setting, click **OK.** The Port Property Menu is closed and Select the pull down Test Menu, Click on **Start**.
- This will launch the **SerialUI-ExarXR17C15x/16L78x UART Series Test Program**

Serial Communication Test Window:

- Displayed Input RS-232 signals:
- **TXD**-A checkmark is seen in this box when Transmitting Data -To be implemented
- **RTS**-Displays the status of Request to Send -To be implemented
- **DTR**-Displays the status of Data Terminal Ready -To be implemented
- **Error Count**-Displays errors that are transmitted and received. When used in full duplex, you must set the Transmit and Receive Data the same. If not, you will detect errors on the Error Count Box- To be implemented
- **Packet Count-** Counts the lines transmitted
- Displayed Output RS-232 Signals:
- **DCD**-Displays the status of Carrier Detect -To be implemented
- **RXD**-Displays the status of Receive data -To be implemented
- **RI**-Displays the status of Ring Indicator -To be implemented
- **DSR**-Displays the status of Data Set Ready -To be implemented
- **CTS**-Displays the status of Clear to Send -To be implemented
- **Internal Loop Test**-This box enables the Transmit Data to the Receive Data internally of the XR16L78x. -To be implemented
- **Test-**These box enables testing functions to repeat.
- **Stop On**-can be defined by two possibilities:
    1) **Error**-Stop the Test when an Error has been Detected -To be implemented
    2) **Time**-Run the Test per time set **[HR] [MIN**]
- **Run Button**-This button starts the Test, Transmission of Data and Receiving of Data.
- Note: This button will not work until you start the test from the main menu. **(Test-Start)**
- **Stop Button**-This button stops the Test in progress
- **Transfer Button**-This button allows you Select Data Patterns
    1) **Quick Brown Fox-**Quick Brown Fox Jumps Over the Lazy Dog
    2) **Alphabets**-0123456789abcdefghijklmnopqrstuvwxyz
    3) **User Pattern**-user-defined pattern
    4) **File**-This is any text file you want to transmit
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- Ready to Transmit and Receive Data:
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Now that you have completed the GUI application program, you are ready to Transmit Data to a Remote Site, or communicate with another Computer. If you want to Communicate from Computer to Computer, use a Crossover Cable that implements Full Null-Modem connections. Refer to Table 5

Table 5

TX-pin2 to RX- pin 3
RX- pin 3 to TX- pin 2
CTS- pin 5 to RTS- pin 4
RTS- pin 4 to CTS- pin 5
GND – pin 7 to GND- pin 7
DRS- pin 8 to DTR- pin 20
DTR- pin 20 to DSR- pin 8

Example 1

The following example is to be done on the local computer and remote computer. The settings have to be the same. Steps 1 thru 19 are for one port, repeat for the other 7 ports.

Load the **SerialUI-ExarXR17C15x/16L78x UART Series Test Program**.

1) Select the **setup** and then **port settings**
2) Check the box that says open **port** for testing
3) Set the **baud rate** for port1 for (921.6k)
4) Set **data length (8)**
5) Set **parity (none)**
6) Set **stop bits (1)**
7) Set **flow control (None)**
8) Set **com base** for **(Com5)**
9) Set **DTR Hysteresis** for **(6)**
10) Set **RTS Hysteresis** for **(8)** and leave the box checked
11) Set the **TxFIFO trigger level** to **(32)** and leave box checked
12) Set the **RxFIFO trigger level** to **(32**) and leave box checked
13) Press the **OK** button on bottom left corner of window
14) Go to the top left corner and click **test**
15) Select **start** and click
16) Find the **test forever** and check
17) Click the **transfer** button
18) Click **Quick Brown Fox**
19) Click the **OK** button

Repeat **steps 2 thru 19** for the remaining ports. Now click the **transfer** button on the **SerialUI-ExarXR17C15x/16L78x UART Series Test Program** for each port on the local side and remote side. You are now transmitting and receiving to the selected ports. You will see the **packet count** number increasing. When you are completed with the transfer of data, click the **stop button** on each port.

Change settings in port settings

1) Select the **test** (on the SerialUI window) and then **stop**
2) Select the **setup** and **port settings**
3) Repeat steps 2 thru 19 and or modify the setting
4) Follow steps 13 thru 19

Notes:

- 1) If the transmitted or receive data is slow, it is possible that one of the RS-232 is bad.